

Sustainable forest management – a balancing act

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Forests cover 69 percent of the land area in Sweden. They are home for many species, are an arena for the traditional Sámi reindeer herding, are important for recreation and rehabilitation, and they provide a wide variety of ecosystem services such as clean water and air, berries and mushrooms, carbon storage and sequestration, as well as protection from landslides and erosion. Forests are, of course, also an important source for a fantastic renewable material: wood. All these different forest values are ultimately affected by how we manage our forest ecosystems.

The fact that forests must be managed sustainably, providing a range of economic, ecological and social values now and in the future, is taken for granted by politicians, forest owners, consumers and nature conservationists alike. However, there is no agreement on what that means in practice. Finding a balance between different forest values is a difficult task, not least because forests are complex, long-lived ecosystems, forest management has long time horizons, and demands on forests are conflicting. That is, there are trade-offs between different management objectives; more-of-everything is not possible. On top of that, the future is increasingly uncertain and challenging, due to multiple and interconnected global crises, including climate change, biodiversity loss, pollution, technological change and geopolitical instability. Thus, forest management decisions have become very complex and there is a need for knowledge on the future consequences of different forest management alternatives. Forest decision support systems (DSS) can provide such knowledge and are therefore essential tools in decision making about forest management and governance.

Forest DSS such as the Swedish Heureka system allow their users to assess the potential impact of different ways of managing the forest, to create potential future scenarios and thus provide evidence-based tools and analysis for making informed decisions. The Heureka forest DSS can be used to analyse the medium and long-term consequences of different forest management practices on the economic, ecological and social values of the forest, and to find combinations of forest management strategies that can balance multiple forest management objectives. Based on a description of the current state of the forest and a large number of models describing ecosystem processes such as tree growth and mortality, future forest development is simulated, often looking 30 to 100 years into the future.

In my lecture, I will use examples from my own research to illustrate how foresight studies using Heureka can help finding a balance between multiple management objectives and give research-based recommendations on how forest management can become more sustainable. I also aim to point out research needs to improve Heureka's capacity to support decision-making for an increasingly uncertain future.